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SYMPOSIUM

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Chandeleur Islands Cannon Site

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Archaeological Resource Management on the Outer Continental Shelf

The Minerals Management Service (MMS) of the Department of the Interior is a relatively new Federal agency created in 1982 for two basic purposes. First, it is responsible for establishing an effective means of collecting revenues generated from mineral leases offshore on Federal and Indian lands throughout the country. Second, the Service is charged with the orderly development of America's offshore energy and mineral resources while properly safeguarding the environment (USDOI, MMS Fact Sheet, n.d.). In order to manage the potential energy and mineral resources on the Outer Continental Shelf (OCS), the MMS has divided areas within its Federal jurisdiction into approximately 3-mile by 3-mile blocks. Private and corporate development of offshore energy and mineral resources on the OCS has the potential for impacting natural and archaeological resources. In order to fulfill its responsibilities for managing archaeological resources on the OCS, the MMS has developed a program to inventory, manage, and protect nonrenewable prehistoric and historic resources.

Numerous laws and orders regulate the MMS archaeological resource management program, mandating that natural resource development activities do not disturb any significant archaeological resources. These laws include the National Historic Preservation Act of 1966, as amended (Public Law 89-665), National Environmental Policy (Public Law 91-190), and OCS Lands Act (Public Law 95-375). The OCS Lands Act defines the MMS's responsibility (USDOI, MMSM 620.1; Stright 1989:5) for the protection of archaeological resources to be restricted to the area affected, directly and indirectly, by mineral-development-related-activities. According to the Department of the Interior's solicitor, the MMS has only the authority to protect archaeological resources on the OCS that may be impacted from the effects of mineral development (MMS Pamphlet 1988:1; Anuskiewicz and Greene 1989:2). The MMS meets its goal of archaeological resource protection through a multilevel analysis system and the use of regional baseline studies that have determined high probability areas for the occurrence of these resources. These studies are periodically updated to reflect a new and expanding database (Anuskiewicz 1988:1).

One goal of the MMS archaeology program is to protect archaeological resources on the OCS. This is accomplished by the development of specific mitigative options for private and corporate lease holders that may impact a potential archaeological resource. These options serve to: (1) protect the potential resource from impacts caused by hydrocarbon and/or other mineral exploration and development on the OCS by designing a protective buffer or avoidance area criteria around the potential resource, or (2) require further study of the potential resource, which serves to mitigate or diminish the damage that may be caused by the proposed exploration and development (Greene and Anuskiewicz 1989:3).

To develop suitable mitigations for potential archaeological resources that may be located within a 3-mile by 3-mile OCS block, the MMS undertakes a multilevel analysis program that begins with regional studies, continues through lease sale areas, and ultimately focuses on specific lease blocks. The regional studies improve our understanding of what resources (historic and prehistoric) occur on the OCS and also serve to develop models delineating areas of high potential for the occurrence of these archaeological resources. The MMS has spent over $1 million to date on regional archaeological studies in the Gulf of Mexico (GOM) OCS.

The initial archaeological resource baseline study was performed in 1977 by Coastal Environments, Inc. (CEI 1977). This study included analysis of prehistoric settlement patterns, sea-level change, cultural history of the GOM, colonial exploration and settlement, historic shipping routes, and numerous other topics, which were synthesized to produce MMS' Archaeological Resource Zones 1 and 2. These are the zones of high probability for historic/prehistoric resources and prehistoric resources, respectively.

In 1986, the MMS contracted with CEI to conduct a limited core testing program offshore Louisiana-Texas in the West Cameron-High Island-Sabine areas. Approximately seventy 4-inch cores were taken from features deemed as "high probability" areas for the location of prehistoric archaeological sites (Pearson et al. 1986). Material from two cores was considered "highly suggestive" of cultural remains. One of these cores contained disarticulated shells of *Rangia cuneata* in an organic matrix. Palynological research indicated that the shells had been subaerially exposed. The other core contained fragments of bones from multiple species of terrestrial, avian, and aquatic animals. The presence of burned bones in the conglomerate served to increase the chain of evidence for a cultural rather than a natural deposit. Both of these areas would qualify for eligibility in the National Register of Historic Places (Greene and Anuskiewicz 1989:4).

The most current regional shipwreck study, by Texas A&M University (Garrison et al. 1989), focused on three major tasks. The study objectives were the following: a.) To reevaluate and make recommendations to change, if necessary, the MMS's Archaeological Resource Management Zone 1 high probability area for the occurrence of historic shipwrecks; b.) To determine the relationship between linespacing intervals of magnetometer data and sidescan sonar contacts and the detection of objects at or below the seafloor; c.) To establish an interpretative framework to characterize unidentified magnetic anomalies and sidescan sonar contacts in an attempt to differentiate between modern marine debris and an historic period shipwreck.

During the course of the study a significant marine archaeological site was discovered near Chandeleur Island, offshore of Louisiana. The MMS provided the funding for Texas A&M University's investigation of an eighteenth-century marine dump or stranding and cannon site. This initial paper serves to introduce subsequent research papers for this session that these investigations generated.

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The Cast Iron Cannon from Chandeleur Islands

Introduction

In July 1989, two eighteenth century Swedish cast iron cannon were recovered from the Chandeleur Islands and then taken to Texas A&M University for conservation.

The scope of the paper covers: 1) The field techniques used to identify the cannon *in situ*, coupled with the innovative use of sacrificial zinc anodes that prevent further deterioration of the corroded metal after removal of some of the concretion underwater; 2) The transportation and storage of the cannon prior to conservation; 3) The mechanical cleaning and the electrolytic reduction processes used to remove the concretion layer and chloride ions from the metal; 4) The techniques used to coat the surface of the cannon with a corrosion inhibitor and final sealant that will hopefully result in a lasting museum quality exhibit; and 5) The description and identification of the cannon.

Initial Identification

During the first visit to the Chandeleur Island site, in May 1989, the cannon were measured and numbered 1 through 6. It was noted that two of the guns were slightly longer than the others and were possibly of a larger caliber. A decision was made to remove the encrustation from around the muzzles of the cannon so that accurate measurements of the bore diameters could be taken. This was successfully done with the careful use of a hammer and a small cold chisel. In this way it was found that the four smaller cannon were three-pounders and the larger two were four-pounders. The trunnions were also exposed in the hopes that there would be makers' marks that could aid in the identification of the origin and date of the cannon. This in turn might help identify the vessel itself. Three of the cannon, numbers 2, 3 and 6 had the letters "IEC" embossed on the right trunnion. These were the only marks that were found during the initial investigation.

The cannon were generally in a poor state of preservation due to being underwater for a long period of time and for a number of pre-depositional reasons. Cannon #2 had a burst muzzle and cannon #5 was badly corroded around the muzzle bell. Cannon #3 had a somewhat off-center bore and was missing one of the trunnions, as was cannon #4. Both #1 and #2 cannon had bad longitudinal cracks in the cast iron, which were also seen in the #4 and #6 cannon after they had been cleaned of their iron concretion at Texas A&M University. The cause of these cracks is uncertain, though it is plausible that they are mainly the result of extensive underwater corrosion.

On-Site Conservation

In long term sea water immersion conditions, an equilibrium will be established between the iron corrosion rate, the diffusion of corrosion products and the build-up of surface solids (encrustation) - insoluble corrosion products, shells, sand, pebbles, residual graphite, artifacts, etc. If the object is disturbed or damaged, different surfaces will be exposed to the surrounding sea water and the equilibrium upset. With the much increased oxygen availability, the iron corrosion rate will increase rapidly. Likewise, if the object is removed from the ocean environment and freely exposed to